

**CLAIMS**

We claim:

- 1           1.     A system comprising:
- 2           a memory sized to include lines to store a band of an image and
- 3     additional lines;
- 4           a wavelet processing logic comprising
- 5                 a wavelet transform to generate coefficients when applied to
- 6     data in the memory;
- 7                 access logic to read data from the memory into the line buffers
- 8     to supply data stored in the memory to the wavelet transform and to store
- 9     coefficients in the memory, such that after data stored at a first pair of lines
- 10    is read from memory into the buffers of the access logic, the access logic
- 11    reuses the first pair of lines to store coefficients generated by the wavelet
- 12    transform that are associated with a second pair of lines different from the
- 13    first pair of lines.

1           2.     The system defined in Claim 1 wherein the access logic stores  
2 coefficients in contiguous lines of memory with coefficients from the same  
3 subband and decomposition level adjacent each other.

1           3.     The system defined in Claim 1 wherein a first line of each of  
2 the first and second pairs of lines are located in the memory at an offset with  
3 respect to each other.

1           4.     The system defined in Claim 3 wherein the access logic stores  
2 the first outputs of the wavelet transform for each coefficient level in the  
3 additional lines within a distance of the offset.

1           5.     The system defined in Claim 3 wherein size of the offset is  
2 different for each transform level.

1           6.     The system defined in Claim 3 wherein the size of the offset is  
2 equal to:

3            $2^{(\text{transform level of coefficient being stored})}$ .

1           7.     The system defined in Claim 6 wherein, during decomposition,  
2     the offset for storing the first rows of each pair of rows of L1 coefficients in  
3     the memory is two lines from the first row of data of the image associated  
4     with said each pair of rows of the L1 coefficients, and the offset for storing  
5     the first row of each pair of rows of L2 coefficients is four lines from the first  
6     row of L1 coefficients associated with said each pair of rows of the L2  
7     coefficients.

1           8.     The system defined in Claim 1 wherein the access logic stores  
2     coefficients associated with a decomposition level greater than level three in  
3     the lines of the memory that previously stored the band of the image.

1           9.     The system defined in Claim 3 wherein the addition lines  
2     relating to the offset are above the line storing the band of the image.

1           10.    The system defined in Claim 1 wherein the wavelet transform  
2     is a forward wavelet transform.

1           11.    The system defined in Claim 1 wherein the wavelet transform  
2    is an inverse wavelet transform.

1           12.    A method comprising:  
2           reading data from a memory into line buffers to apply a wavelet  
3    transform thereto; and  
4           storing coefficients created by applying the wavelet transform at lines  
5    in the memory so that each set of coefficients generated from data stored at  
6    each pair of lines in the memory is stored in the memory at lines that are at  
7    an offset with respect to said each pair of lines in the memory.

1           13.    The method defined in Claim 12 further comprising access  
2    logic reusing a first pair of lines to store coefficients generated by a wavelet  
3    transform, that are associated with a second pair of lines different from the  
4    first pair of lines, after data stored at a first pair of lines is read from memory  
5    into the buffers of the access logic, and wherein a first line of each of the first  
6    and second pairs of lines are located in the memory at an offset with respect  
7    to each other.

1           14.    The method defined in Claim 13 further comprising the access  
2    logic storing the first outputs of the wavelet transform for each coefficient  
3    level in additional lines within a distance of the offset.

1           15.    The method defined in Claim 13 wherein size of the offset is  
2    different for each transform level.

1           16.    The method defined in Claim 13 wherein the size of the offset  
2    is equal to:

3            $2^{(\text{transform level of coefficient being stored})}$ .

1           17.    The method defined in Claim 16 wherein, during  
2    decomposition, the offset for storing the first rows of each pair of rows of L1  
3    coefficients in the memory is two lines from the first row of data of the  
4    image associated with said each pair of rows of the L1 coefficients, and the  
5    offset for storing the first row of each pair of rows of L2 coefficients is four  
6    lines from the first row of L1 coefficients associated with said each pair of  
7    rows of the L2 coefficients.

1           18.    The method defined in Claim 12 further comprising access  
2    logic storing coefficients associated with a decomposition level greater than  
3    level three in the lines of the memory that previously stored the band of the  
4    image.

1           19.    The method defined in Claim 13 wherein the addition lines  
2    relating to the offset are above the line storing the band of the image.

1           20.    An article of manufacture comprising at least one recordable  
2    media storing executable instructions thereon which, when executed by a  
3    processing device, cause the processing device to:  
4            read data from a memory into line buffers to apply a wavelet  
5            transform thereto; and  
6            store coefficients created by applying the wavelet transform at lines in  
7    the memory so that each set of coefficients generated from data stored at  
8    each pair of lines in the memory is stored in the memory at lines that are at  
9    an offset with request to said each pair of lines in the memory.

1           21.    The article of manufacture defined in Claim 20 further  
2    comprising instructions, which when executed by the processing device  
3    cause the processing device to reuse a first pair of lines to store coefficients  
4    generated by a wavelet transform, that are associated with a second pair of  
5    lines different from the first pair of lines, after data stored at a first pair of  
6    lines is read from memory into the buffers of the access logic, and wherein a  
7    first line of each of the first and second pairs of lines are located in the  
8    memory at an offset with respect to each other.

1           22.    An apparatus comprising:  
2           means for reading data from a memory into line buffers to apply a  
3    wavelet transform thereto; and  
4           means for storing coefficients created by applying the wavelet  
5    transform at lines in the memory so that each set of coefficients generated  
6    from data stored at each pair of lines in the memory is stored in the memory  
7    at lines that are at an offset with request to said each pair of lines in the  
8    memory.